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VIA ELECTRONIC FILING

August 12, 2019

Marlene Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 201154

Re: ***Ex Parte* Notification**

ET Docket No. 18-295, *Unlicensed Use of the 6 GHz Band*; and

GN Docket No. 17-183, *Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*

Dear Ms. Dortch:

On August 9, 2019, the undersigned and other representatives from Wi-Fi Alliance ("WFA") met with staff from the Office of Engineering and Technology ("OET") regarding the above-referenced proceedings. The complete list of the meeting participants is provided below.

Wi-Fi Alliance:

Alex Roytblat, Senior Director of Regulatory Affairs, Wi-Fi Alliance
Chris Szymanski, Vice Chair, Wi-Fi Alliance Regulatory Group (Broadcom)
Hassan Yaghoobi, Chair, Wi-Fi Alliance Automatic Frequency Coordination ("AFC") Task Group (Intel)
Chuck Lukaszewski, Vice Chair, Wi-Fi Alliance AFC Task Group (HP Enterprise)
Alan Norman, Vice Chair, Wi-Fi Alliance AFC Task Group (Facebook) (by phone)
Mark Hamilton, Vice Chair, Wi-Fi Alliance AFC Task Group (Commscope) (by phone)
Russell Fox, Counsel, Wi-Fi Alliance (Mintz)
Jonathan Markman, Counsel, Wi-Fi Alliance (Mintz)

OET:

Julius Knapp
Ira Keltz (by phone)
Aspasia Paroutsas
Michael Ha
Bahman Badipour
Barbara Pavon
Greg Callaghan

During the meeting, we discussed the attached presentation, providing an update on the next generation of Wi-Fi (Wi-Fi 6)[1/] and how access to 5925-7125 MHz ("6 GHz") spectrum capacity is needed to support the growing Wi-Fi ecosystem. We reviewed the applicability of generally proposed regulatory solutions to different Wi-Fi use cases. We provided an overview of Wi-Fi Alliance efforts towards development of the AFC system.

We shared information on establishment of the new Wi-Fi Alliance AFC Task Group and emphasized Wi-Fi Alliance's commitment to enabling AFC development and implementation. We described three AFC implementation models currently under consideration and highlighted the necessity to regulate AFC functionality – not design – so as to enable innovation and commercial viability. Finally, we shared views on the AFC multi-stakeholder approach.

* * * *

Pursuant to Section 1.1206(b)(2) of the Commission's rules, an electronic copy of this letter is being filed in the above-referenced docket. Please direct any questions regarding this filing to me.

Respectfully submitted,

/s/ Alex Roytblat

WI-FI ALLIANCE
Alex Roytblat
Senior Director of Regulatory Affairs
aroytblat@wi-fi.org

Attachment

cc: (each by e-mail)
Julius Knapp
Ira Keltz
Aspasia Paroutsas
Michael Ha
Bahman Badipour
Barbara Pavon
Greg Callaghan

1/ *See* Wi-Fi Alliance, *Wi-Fi Certified 6 Coming in 2019,* Press Release, Jan. 8, 2019 available at https://www.wi-fi.org/news-events/newsroom/wi-fi-certified-6-coming-in-2019.

6 GHz Update

August 9, 2019

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OUTLINE

- Update on Wi-Fi 6 in 6 GHz
- 6 GHz Regulatory Objective
- 6 GHz Regulatory Solutions
- 6 GHz AFC
- AFC Multi-Stakeholder Approach

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Update on Wi-Fi 6 in 6 GHz

- Wi-Fi 6 in 6 GHz is essential to meeting America's growing demand for wireless connectivity
  - Success of 5G rollout depends on Wi-Fi functionality
- IEEE 802.11ax Draft 4.X contains enhancements for 6 GHz operation, discovery and association
- Wi-Fi Alliance is proceeding with Wi-Fi 6 (802.11ax) standalone PHY/MAC interoperability certification program for 6 GHz
  - Program is on an expedited track to meet projected strong market demand:
- Wi-Fi 6 in 6 GHz products expected to be launched in 2020
- Regulatory certainty (i.e., 6 GHz R&O) is needed to sustain industry's investment, development and implementation efforts
  - Wi-Fi industry cannot afford to wait for another decade a la UNII-2B or UNII-4

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6 GHz Regulatory Objective

- **6 GHz Objective**: Regulatory solutions that enable new opportunities for unlicensed use while ensuring that licensed services operating continue to thrive in the 6 GHz band
  - "new opportunities for unlicensed use" must be commercially viable
  - Licensed operations must be fully protected and not constrained
- Wi-Fi ecosystem: wide range of Wi-Fi products and end users; different and innovative use cases; diverse business models and price points
- Viability of 6 GHz unlicensed ecosystem requires all three proposed device-classes/use-cases
  - **Very Low Power (VLP) devices** address short-range, high-bandwidth scenarios like 5G gigabit mobile tethering (including automotive use cases) that exist today, as well as new "last meter" apps like AR/VR, IoT, direct peer-to-peer
  - **Low Power Indoor (LPI) devices** address the bulk of the consumer segment, which are deployed singly or very small groups, exclusively indoors
  - **Standard Power AFC controlled devices** address enterprise and service-provider segments, deployed with on-premise or cloud controllers

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6 GHz Regulatory Solutions

Three methods to manage UNII interference (regulatory “tool box”):

1. Limit AP Tx conducted power to below 25 mW
   – feasible for VLP devices which are extremely cost sensitive and may not support geolocation capability
2. Restrict AP to indoor-only with Tx conducted power level below 250 mW
   – feasible for LPI devices designed for indoor operations which are extremely cost sensitive, and where automated geolocation capability (e.g. GPS) does not work.
3. Geolocation based frequency avoidance (i.e., AFC) with conducted power limit below 1W
   • Standard Power APs will typically have higher end antennas and RF; would more likely be part of a managed network with geolocation information
   • Outdoor deployments will likely employ automated geolocation methods

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6 GHz AFC

- Wi-Fi Alliance supports AFC development
  - Significant effort expanded on development of AFC requirements and concepts
  - Board of Directors has approved formation of a new AFC Task Group for the purpose of creating a “reference” AFC architecture, operation, and compliance test specifications for the Wi-Fi ecosystem
    - membership voted unanimously to take ownership of this work and commit the necessary resources

- Wi-Fi Alliance is uniquely positioned to advance AFC development
  - Global, non-profit industry association of over 800 leading companies from dozens of countries -- membership represents every aspect of Wi-Fi ecosystem
  - 45,000 devices certified since 2000 (see Wi-Fi Product Finder)
  - 20 year-long record of developing complex test specifications in compliance with the FCC requirements
  - Internationally recognized seal of approval for devices meeting industry-agreed standards for interoperability, security, and application specific protocols
  - Interoperable with billions of installed devices
  - Proven performance and security that provide positive user experiences
  - ISO 17025 certification process of development and testing; testing conducted at independent test organizations around the world

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6 GHz AFC (cont.)

- Wi-Fi devices will be the vast majority of 6 GHz unlicensed radios
- AFC regulations must take in to account Wi-Fi ecosystem diversity and marketplace realities
  - "One size fits all" AFC approach will not work
  - Regulate AFC functionality not implementation
- AFC regulations must scale to support mass market implementation in different countries
  - 6 GHz Fixed is co-primary and widely deployed in over 50 countries
  - Wi-Fi technology is extremely cost sensitive: necessary to ensure commonality among AFC regulatory elements to enable economies of scale/operations in multiple countries
- Rigorous certification regime will ensure AFC functionality to protect incumbent operations – if AFC functionality cannot be certified, it cannot be deployed – full protection for incumbents
  - All AFC implementations must demonstrate with certainty the functional capability to enforce the Commission's chosen interference protection criterion for 6 GHz incumbent radio services
  - ULS database is integral to AFC functionality
    - Accurate ULS ensures efficient utilization of 6 GHz spectrum - clearly in the public interest, status quo dating back decades is simply not sustainable
    - Licensees have responsibility and incentive to ensure that their operations are accurately recorded in ULS

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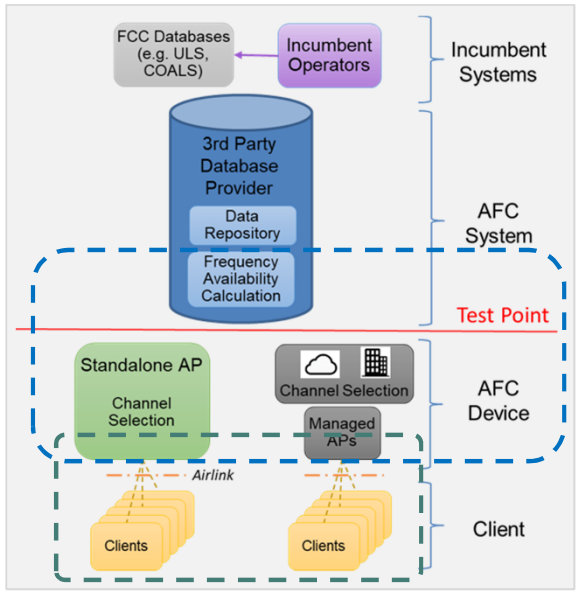
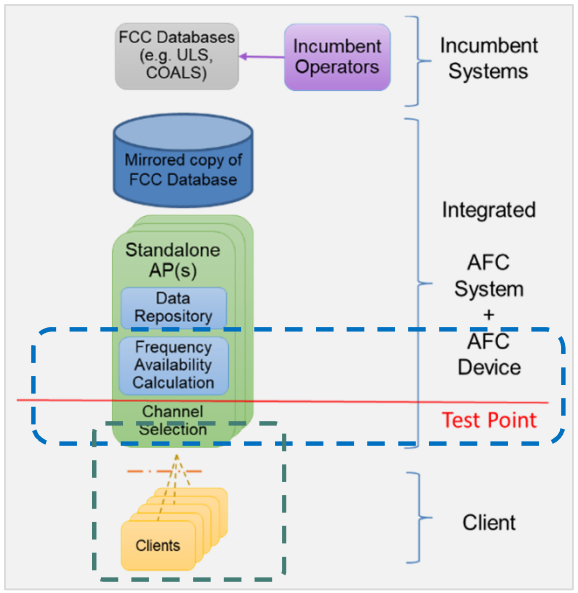
6 GHz AFC: Three Models

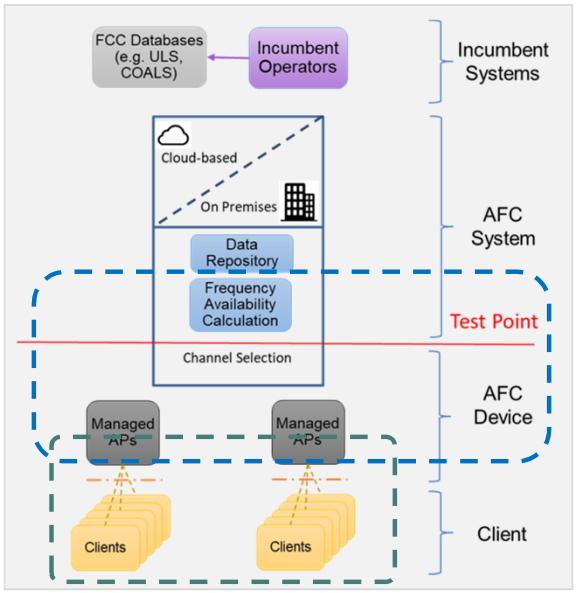
Use Case 1 - 3rd Party AFC Operator



Use Case 2 – Embedded AFC



Use Case 3 – Private Cloud AFC



Scope of approved WFA 6 GHz MAC/PHY certification under development

Potential scope of FCC 6 GHz regulatory certification tests for AFC Operators & AFC Devices

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AFC Multi-Stakeholder Approach

1. AFC necessary regulatory parameters should be decided in the proceeding (i.e., established in the 6 GHz R&O):
   – protection criteria, propagation/path loss models, multipath fading, allowable EIRP, etc.
2. Post 6 GHz R&O – FCC organized 6 GHz AFC Administrative Workshops – contribution driven process focused on:
   – Best Practices
   – End-to-end Interference resolution procedures
   – Deployment models & technical parameters of systems
   – Mutually-agreed lab and/or field testing
3. Rigorous FCC certification regime will ensure AFC functionality to protect incumbent operations – if AFC functionality cannot be certified, it cannot be deployed – full protection for incumbents
   – All AFC operators must demonstrate with certainty the functional capability to enforce the Commission's interference criteria for protection of the 6 GHz licensees

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